

## Glossary of Terms and Abbreviations

Abalone seed - Abalone reared in captivity and ranging in size from a fraction of an inch to several inches. Used primarily for out-planting to recover depleted populations.

Absolute abundance - The total number of abalone in a population. This is rarely known and is typically an estimate.

Abundance - The number of abalone counted or estimated. See *relative* and *absolute abundance*.

Adaptive management - In regard to a marine fishery, it means a scientific policy that seeks to improve management of biological resources, particularly in areas of scientific uncertainty, by viewing program actions as tools for learning. Actions shall be designed so that even if they fail, they will provide useful information for future actions. Monitoring and evaluation shall be emphasized so that the interaction of different elements within the system can be better understood.

Allee effect - A minimum density of abalone spawners is essential for successful broadcast spawning. When densities drop below a critical threshold, spawning success declines, resulting in population declines and even localized extinctions.

Allocation - Dividing the take of a resource between recreational, commercial and ecosystem needs.

Annual limit - The number of abalone that can be legally taken by one person in a year.

Aquaculture - The propagation, cultivation, maintenance and harvest of aquatic plants and animals.

Assessment - A formal study and review of a population based on a standardized method.

Management Authority - The power to adopt and implement regulations delegated by law to the Fish and Game Commission or the California Department of Fish and Game. Specifically, it means "the provision of law which permits or obligates the agency to adopt, amend, or repeal a regulation" [Government Code §11349(b)].

Bag limit - The number of abalone that can be legally taken per person per day.

Benthic - On or relating to the bottom of a sea or ocean.

Biological reference points - Limits within which abalone take should be constrained in order to maintain sustainability.

Biomass (B) - The total weight of a stock or population of organisms at a given point in time.

Broodstock - Individuals from a natural population that are to be used as parent stock in aquaculture facilities.

California current - A southward moving, cold water current along the California coast.

Catch-per-unit-of-effort (CPUE) - The catch obtained per unit of fishing effort (for example: number of abalone taken per dive).

Cohort - A group of individuals of a species of approximately the same age that resulted from a single spawning event, period, or season.

Commercial fishing - The act of fishing with the intent of selling the catch.

Commission - Fish and Game Commission.

Community maps - Maps displaying information on habitat and species distribution.

Constituent - Any individual interested in or affected by fishery recovery and management decisions. Constituents include the general public, consumptive and non-consumptive resource users, and members of the scientific community.

Coralline algae - Coralline algae are calcified (containing hard calcium-based structures) red algae that are typically divided into two groups: articulated and encrusting. Articulated corallines are branching and tree-like, and are attached to the substrate by root-like holdfasts. The encrusting corallines form crusts over the substrate and contain a substance that induces settlement of larval abalone.

Creel survey - Survey to gather catch information from recreational fishermen.

Cryptic - Animals that live in hidden locations, as in crevices or under rocks.

Daily limit- Same as bag limit: The number of abalone that can legally be taken per person per day.

Data-limited - A situation where essential fisheries information is lacking and a precautionary approach to resource management decisions is warranted.

Data-rich - Having sufficient essential fishery information to make informed management decisions.

Density - Number of organisms per unit of area.

Depleted fishery - The reduction of a population to low levels that can no longer support a fishery.

Depressed fisheries - A fishery for which the best available scientific information and other relevant information that the Commission or Department possesses or receives, indicates that a declining population trend has occurred that may result in a non-sustainable condition.

Depressed stock - A stock whose abundance has declined to a level below which maximum long-term productivity cannot be achieved or which may adversely affect the health of the ecosystem.

Drift algae (or drift kelp) - Marine algae fragments that are carried on currents toward the ocean bottom where they may be more accessible to abalone and other herbivores.

Effort - A measure of time or number of units (fishermen, boats, etc.) used in fishing. Fishing effort is usually expressed as time fished but may include the number of people fishing.

El Niño - A periodic warming of the ocean surface waters at the equator in the Pacific Ocean. It can affect upwelling of cold, nutrient-rich waters nearshore.

Emergent - Being in plain view on the surface of the substrate; the opposite of cryptic. Emergent abalone is defined as abalone that can be surveyed without moving habitat or using artificial lights.

Essential fishery information (EFI) - As defined by the Marine Life Management Act, it is the information necessary to permit management of fisheries according to the requirement of this Act. EFI includes information about fish life history and habitat requirements and any other information related to the biology of a fish species, the status and trends of fish populations, fishing effort and catch levels, and fishery effects on fish age structure and on other marine living resources and users.

Extirpate - To cause extinction (used in the ARMP for localized extinction).

Ex-vessel value - The value of fish at first sale by fishermen at the dock (as opposed to wholesale or retail value).

Fecundity - The reproductive capacity of an individual female animal, generally expressed as the number of eggs or larvae per unit weight or per individual.

Fishery-dependent - Describes information collected directly from a fishery (such as creel survey data, report card information, etc.).

Fishery-independent - Describes information collected from non-fishery related surveys (such as dive surveys).

Genetic bottleneck - A reduction of a breeding population's size to a few individuals, which leads the loss of genetic variability.

Genetic diversity - The range of genetic variability of a species that occurs throughout its population.

Genetic markers - A characteristic segment of DNA material that identifies a group of closely related individuals.

Geographic information system (GIS) - Computerized mapping systems used to relate demographic, biological, habitat, and other characterization database information to location.

Global Positioning System - (GPS) A satellite based system which provides very accurate longitude and latitude.

Hectare - A metric unit of measure equal to 10,000 square meters.

Index sites - Locations within key areas where assessment of criteria is conducted periodically.

Intertidal area - The part of the shore that lies between the low and high water lines.

Key areas - Areas of abalone habitat that have experienced high use in former or current fisheries.

Key locations - Specified areas where a species is known to live, based on survey data and landing records. These are used to identify areas for recovery.

Landings - The number or weight of abalone taken by fishermen.

Landing receipt - A document provided by the Department to commercial fish markets for recording landing information. Information required includes date, port of landing, species or market category of fish, pounds landed, and price paid. It is also called market receipt.

Macroalgae - Multicellular algae (visible without using a microscope) such as giant kelp and bull kelp; having a filamentous, sheet, or mat-like appearance.

Management - In the ARMP, management is defined as assessment, research, or development and implementation of regulations pertaining to abalone fishing. Currently, management applies to northern California red abalone, but ultimately will apply to any area or species reopened to fishing.

Management regions - The California coast has historically been managed for abalone in three separate regions: northern, central, and southern. If the central region is reopened for fishing, however, it may be combined with the northern region into a single region.

Management zones - Under the long-term management plan, management regions will be further subdivided into zones for each species to allow area-specific allocation of take.

Mandates - Something required by a statute or regulation.

Mariculture - The commercial raising of fish, crustaceans, and other oceanic species.

Marine Protected Areas (MPAs) - Areas closed to all fishing, or to specific user groups, or to the take of certain species; they are used to geographically limit effort and to protect portions of stocks.

Maximum sustainable yield (MSY) - The highest average yield over time that does not result in a continuing reduction in stock abundance. Determination of MSY must take into account fluctuations in abundance and environmental variability.

Moratorium - A legally authorized suspension of activity (such as ending the issue of new permits or the closure of all fishing for a particular species).

Nautical mile - A measure of distance used in marine navigation equal to 6,080 ft (1.15 miles).

Non-consumptive uses - Activities that involve a resource without take or consumption.

Optimum yield (OY) - An adjustment of the maximum sustainable yield that provides the greatest overall benefit to the public, particularly with respect to food production and recreational opportunities, by taking into account the relevant economic, social, or ecological factors. In the case of an overfished fishery, the OY allows rebuilding to occur to a level consistent with producing maximum sustainable yield in the fishery.

Overfishing - A rate or level of take that the best available scientific information indicates is not sustainable.

Pathology - The study of the essential nature of diseases and of the structural and functional changes produced by them.

Poaching - The taking of game or fish by illegal methods. Abalone poaching includes: taking more than the daily or annual limit, taking undersize abalones, violating seasonal or area closures, using improper collecting-bars, taking additional limits for others ("dry-sacking"), and fishing without a license.

Population - A species, subspecies, or geographical grouping that is considered a unit for recovery or management.

Precautionary approach - A fishery management principle that implements conservation measures even in the absence of scientific certainty that fish stocks are being overexploited. A common element in the application of this approach is the definition of limits intended to safeguard the long-term productivity of a stock.

Random, spatially-stratified sampling - Statistical sampling procedure in which individual samples within a discrete habitat are drawn at random, and are also collected among different habitats to ensure that each habitat is adequately represented.

Recovery - In the ARMP, recovery is defined as assessment, research, or development and implementation of regulations pertaining to rebuilding depressed abalone populations. Recovery currently applies to five abalone species in central and southern California: red, pink, green, black, and white.

Recovery areas - Areas that were known to have supported a commercial and/or recreational fishery in the past, were determined from commercial landing block data and known recreational fishing areas.

**Recruit** - In common usage, this term refers to a newcomer to a field or activity. In biology, it typically refers to a larval or juvenile organism as it settles or moves into adult habitat, or to an organism entering the exploitable stage of its life cycle .

**Recruitment** - Recruitment is a broad term that includes settlement of young-of-the-year abalone (less than 31 mm), growth into reproductive sizes that contribute to spawning populations (greater than 50 mm), and entry into the fishery at sport legal size.

**Relative abundance** - An index of fish population numbers used to compare populations from year to year. This does not measure the actual numbers of fish but shows changes in the population over time.

**Remotely operated vehicle (ROV)** - A remotely-operated vehicle is an unmanned submarine that can be controlled from aboard a ship and can take video and still pictures.

**Report cards** - Cards issued to sportsmen for recording the location and number of abalone taken.

**Research protocol** - A defined methodology used to collect fisheries data and/or conduct fishery research.

**Sabellid worm** - A marine parasitic worm that lives on the growing edge of mollusc shells causing deformities. A South African species was introduced accidentally into California aquaculture facilities. To prevent introduction into the natural environment, a ban on out-planting of cultured abalone has been established, except from certified sabellid-free facilities.

**Self-sustaining population** - A resource that can provide sufficient reproductive potential necessary to replace individuals removed from the population.

**Senescent** - growing old, ageing.

**Serial depletion** - An event that happened in the combined abalone/sea urchin fishery. Abalone species were successively depleted, beginning with the most desirable and easily accessible, and progressing to the least desirable and accessible. Likewise, single species of abalone were sequentially depleted from areas near access points to those far from access points.

**Settlement** - In marine ecology, the process by which organisms change from an open ocean life history phase to assume a new mode of life as a member of a sea-floor community.

**Size or length-frequency distributions** - A graphical representation of the number of individuals by length.

**Size limit** - The minimum size an organism must have for it to be legally taken or possessed.

**Sonar** - A remote-sensing technology that uses underwater sound waves to locate or track objects.

**Southern California Bight** - Geographical area between Point Conception in Santa Barbara County and the Mexican border.

**Species-specific** - Applying only to a particular species.

**Stock** - A distinct, reproductively isolated population. In practice, the members of a species inhabiting a defined area that can be discreetly managed.

**Stock collapse** - The reduction of stock to very low levels.

**Sublegal** - Individuals smaller than the legal size of capture.

**Sub-populations** - Smaller groups or part of a larger population.

Subtidal - Areas (including the water column and bottom substrate) that are always beneath the surface of the ocean.

Sustainable, Sustainable use, and Sustainability - A population that is self-reproducing and able to maintain its genetic diversity over a long period of time. In a fished population sustainability also involves social and economic benefits, maintaining biological diversity, and managing fisheries in a way that does not exceed optimum yield.

Total Allowable Catch (TAC) - The catch level, in number or weight of abalone, that is allowed each year under sport or commercial fishery regulations.

Transect - A fixed linear area where organisms are enumerated to estimate their density and distribution in relation to their habitat.

Upwelling - The upward movement of deep waters into the nearshore ecosystem due to springtime winds moving the topmost layers of water away from land.

Young-of-the-year (YOY) - Abalone less than 1 yr old, estimated at 30 mm or less in size.

Withering Syndrome (WS) - A disease of abalone characterized by shrinking of the foot and usually leading to death, caused by a bacteria-like organism.